Charles Josserond – IR CNRS
Ingénieur en développement d'expérimentation

Laboratoire
Science et Ingénierie des Matériaux et des Procédés

8ème Journée AlpesVIEW CNRS
13 décembre 2023

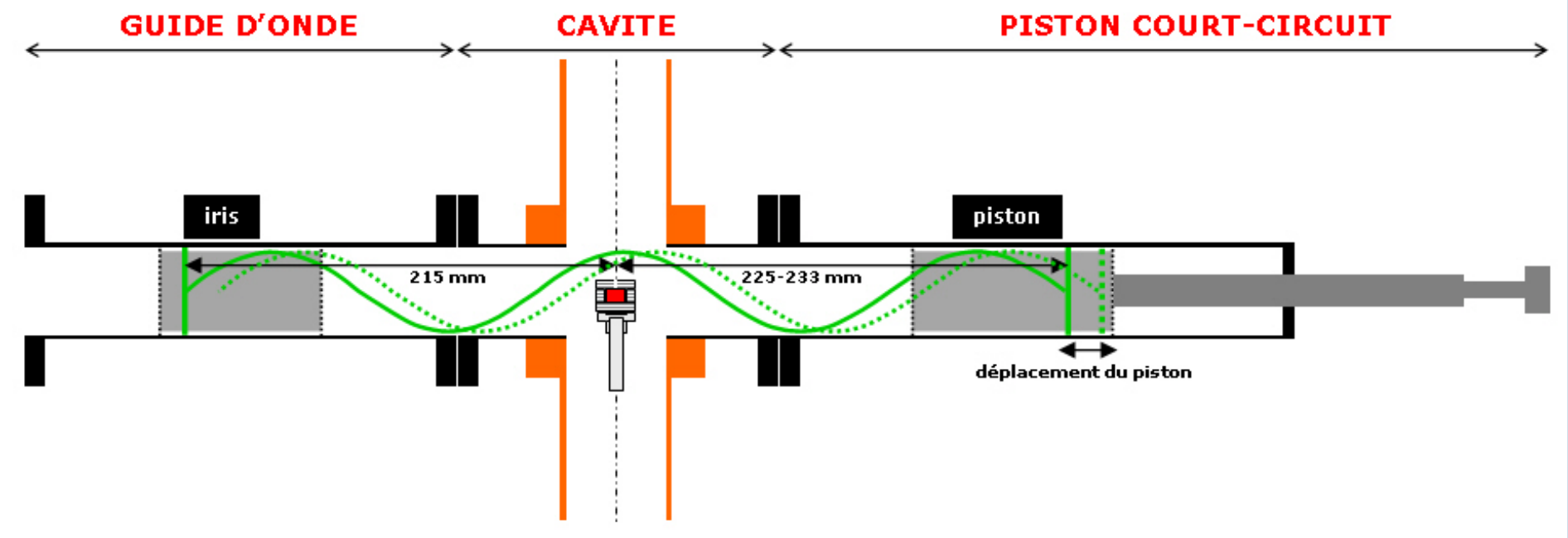
Micro-ondes → macro déformation

Le déroulement de la présentation…

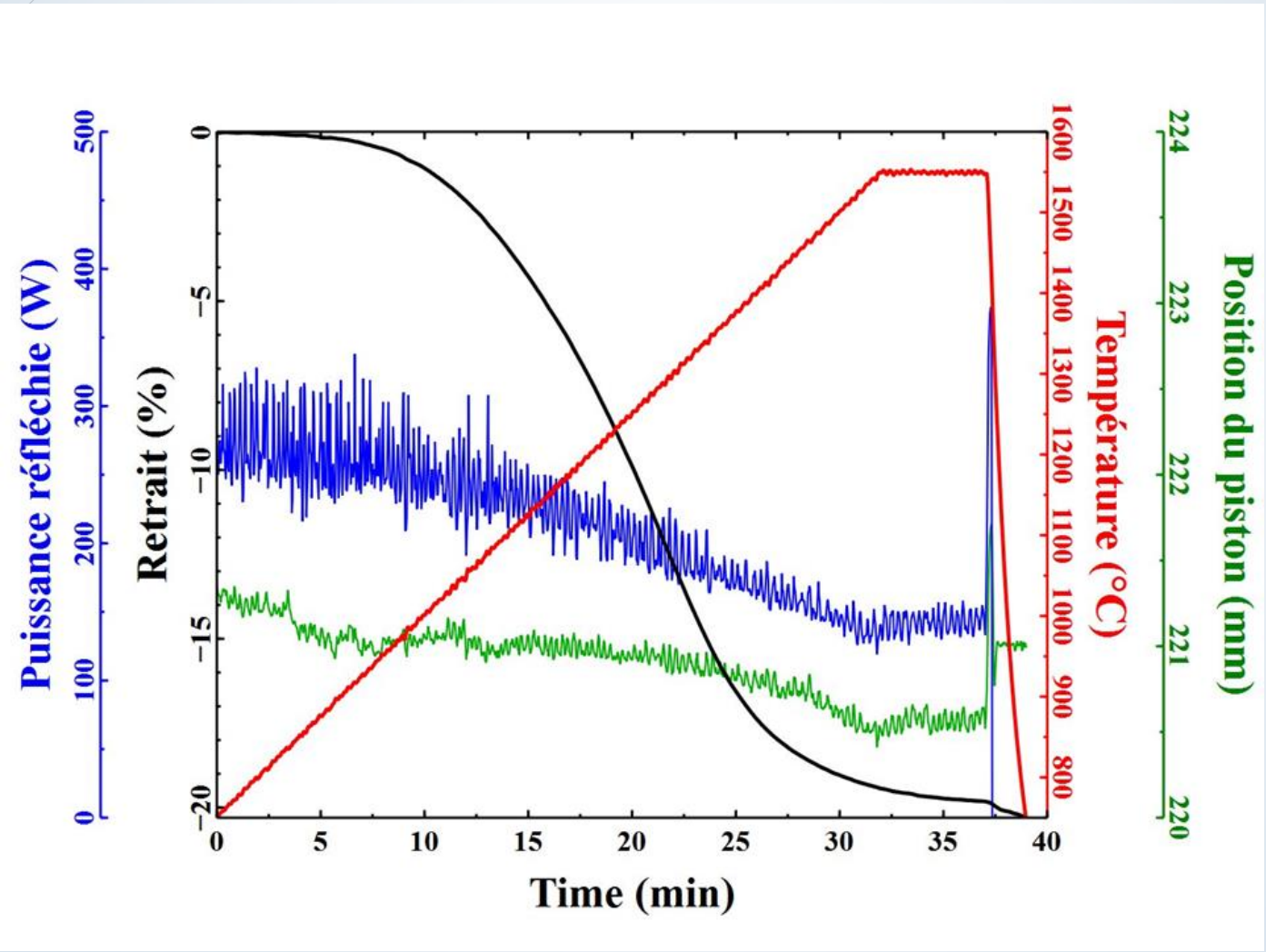
1) Principe de fonctionnement
2) Descriptif du dispositif
3) Le code …
4) Et maintenant ?
5) Questions / réponses

1) Principe de fonctionnement

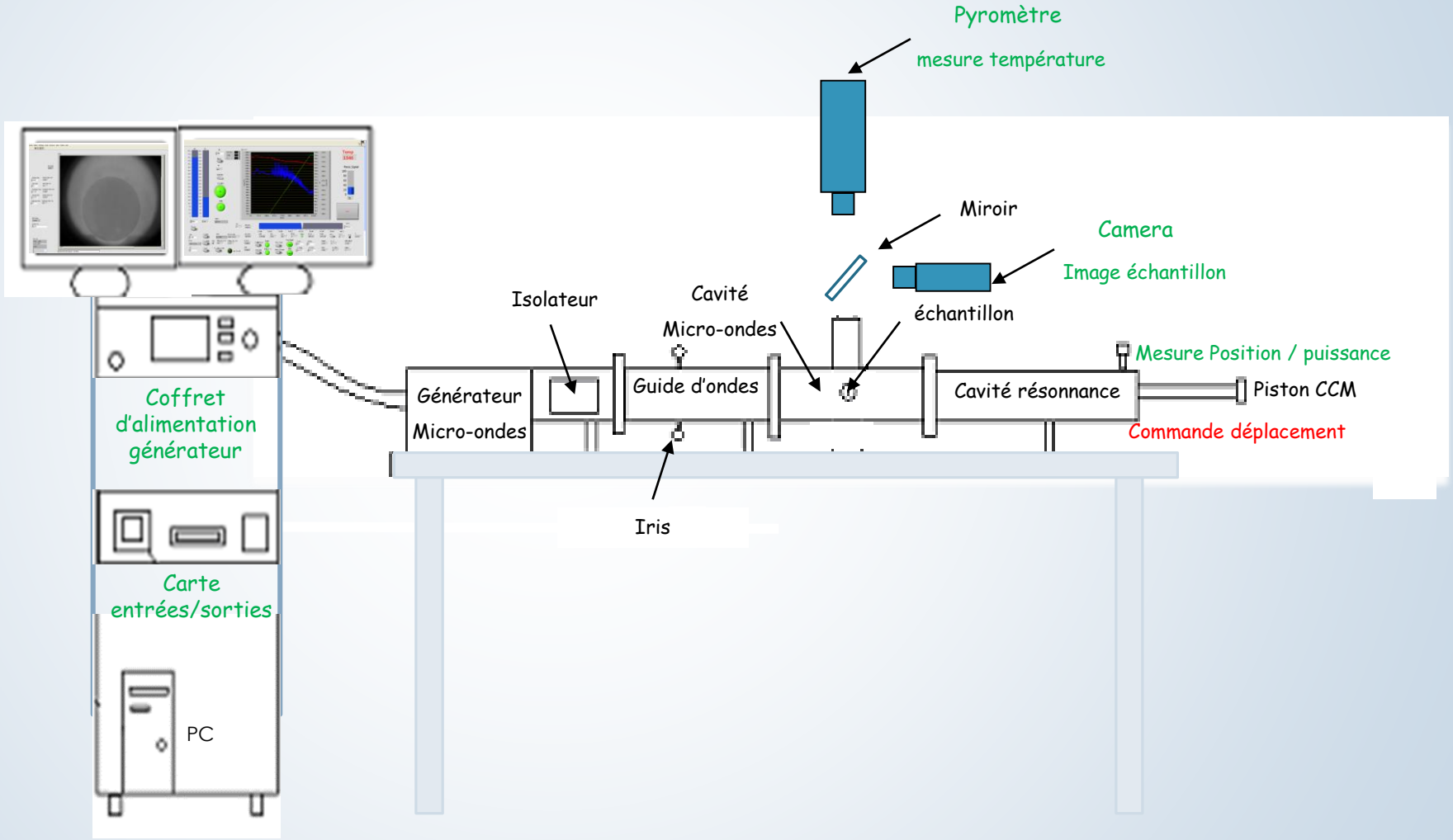
1) Principe de fonctionnement



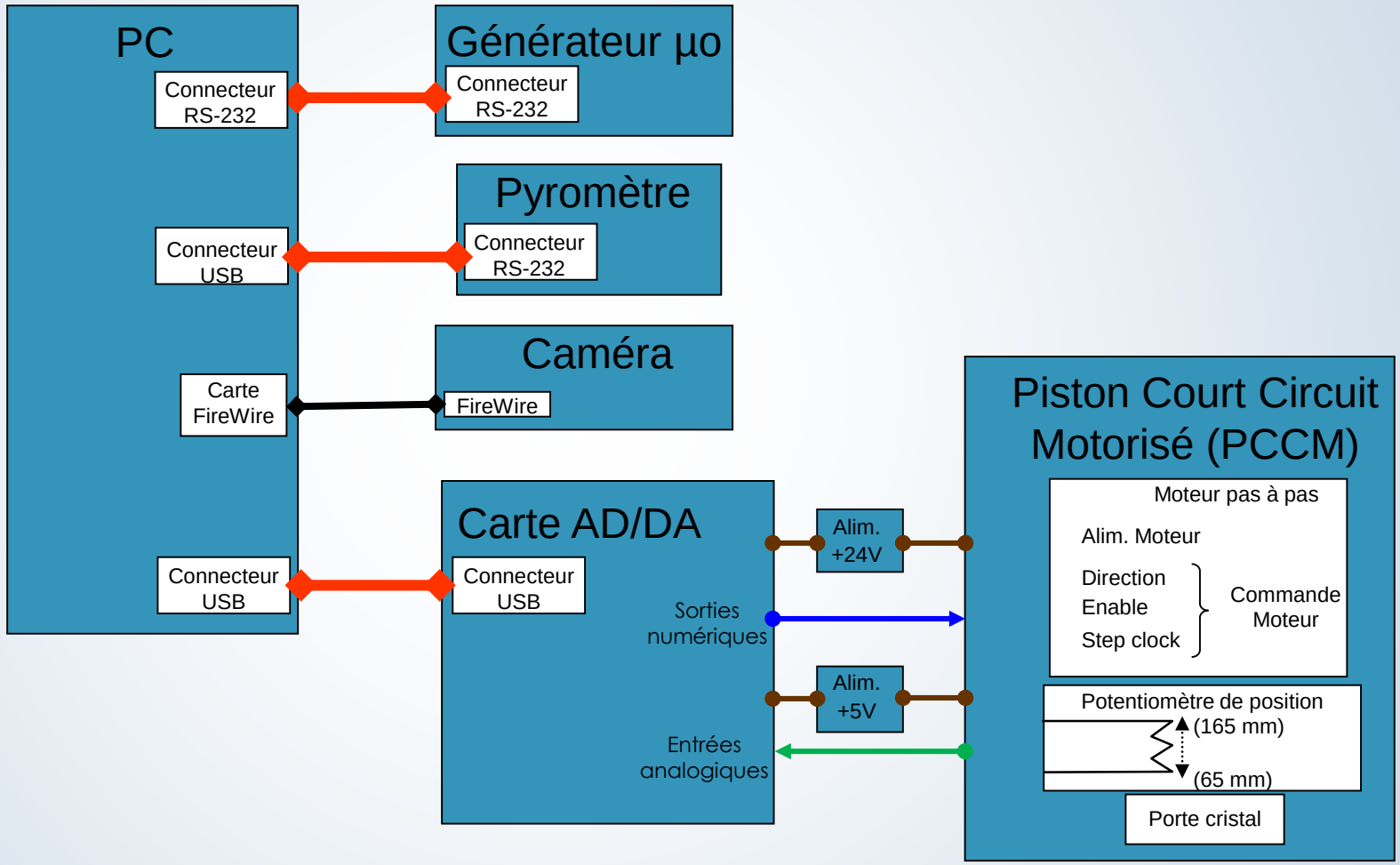
1) Principe de fonctionnement



2) Descriptif du dispositif

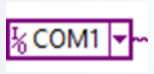


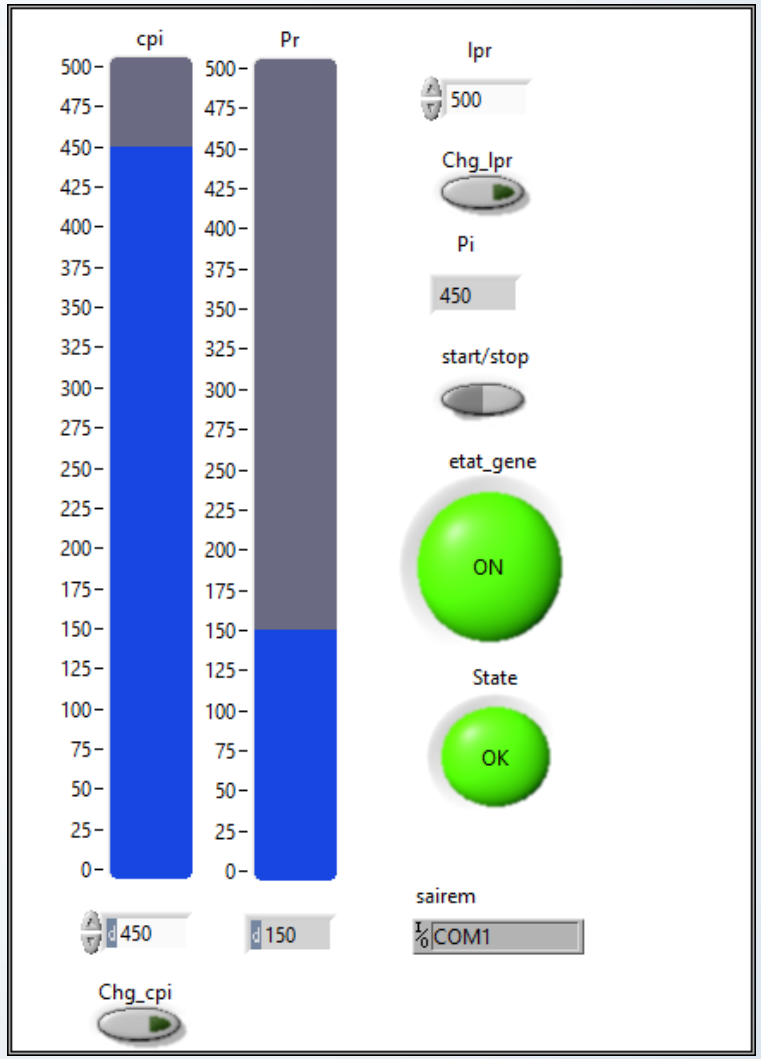
2) Descriptif du dispositif



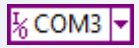
Measurement & **A**utomation e**X**plorer

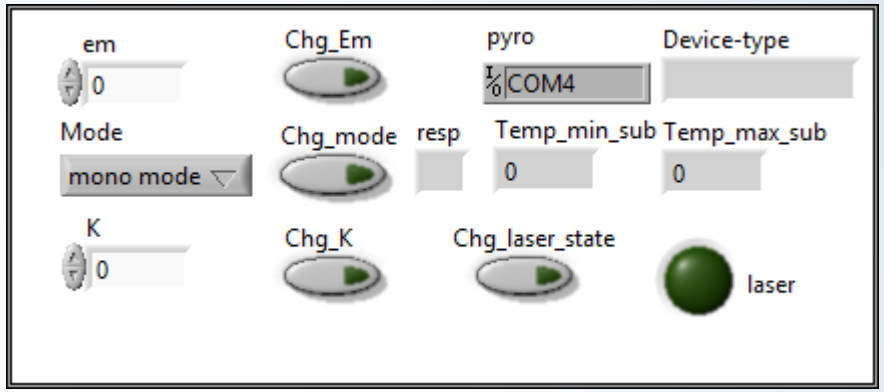
a) Générateur micro-ondes

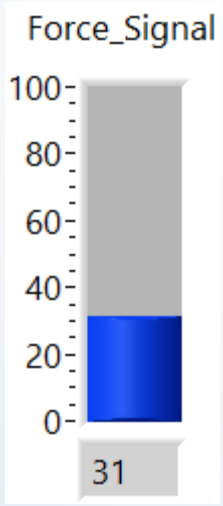




b) Pyromètre

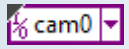

COM3

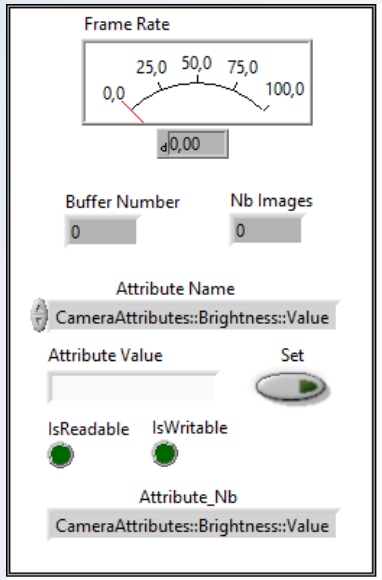

em
0
Chg_Em
pyro
COM4
Device-type
Mode
mono mode
Chg_mode
resp
Temp_min_sub
0
Temp_max_sub
0
K
0
Chg_K
Chg_laser_state
laser

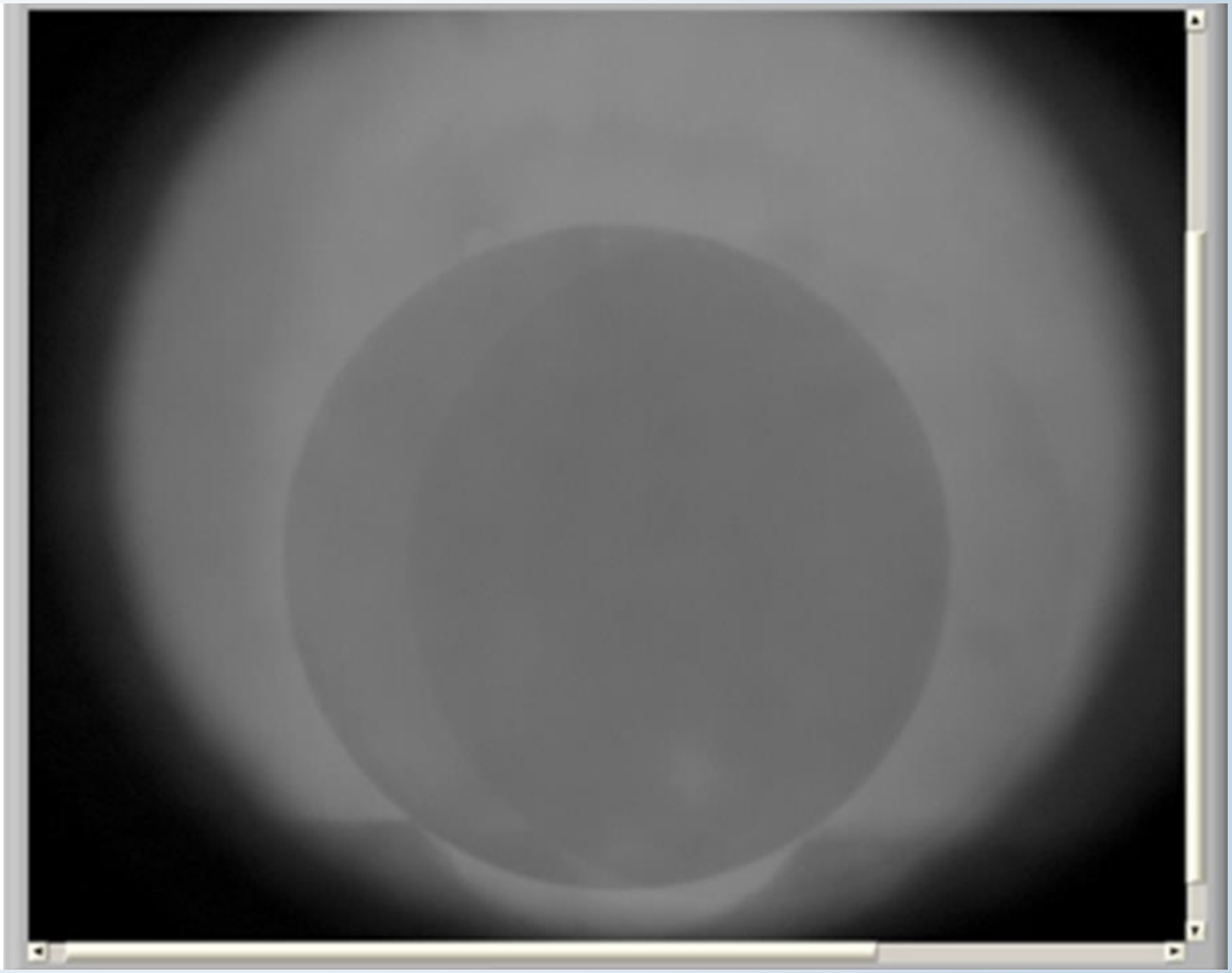

Force_Signal
100
80
60
40
20
0
31


Temp (°C)
0

c) Caméra *(2588 x 1958) -* **Capteur** *Sony ICX282 – 3 fps – 12b*



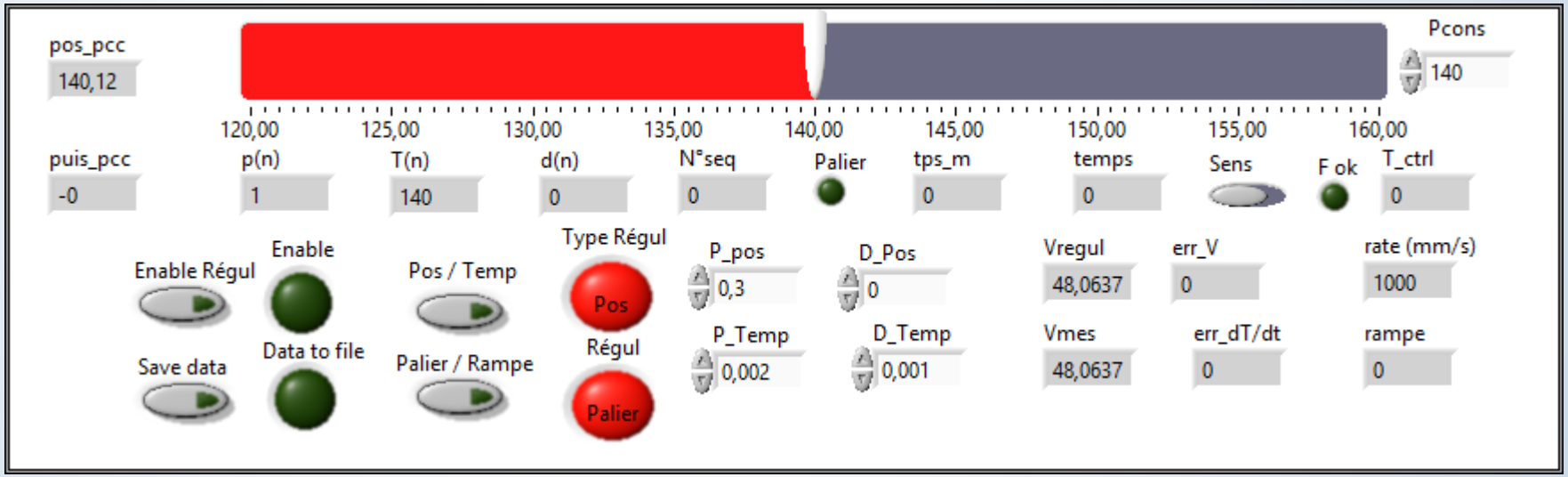




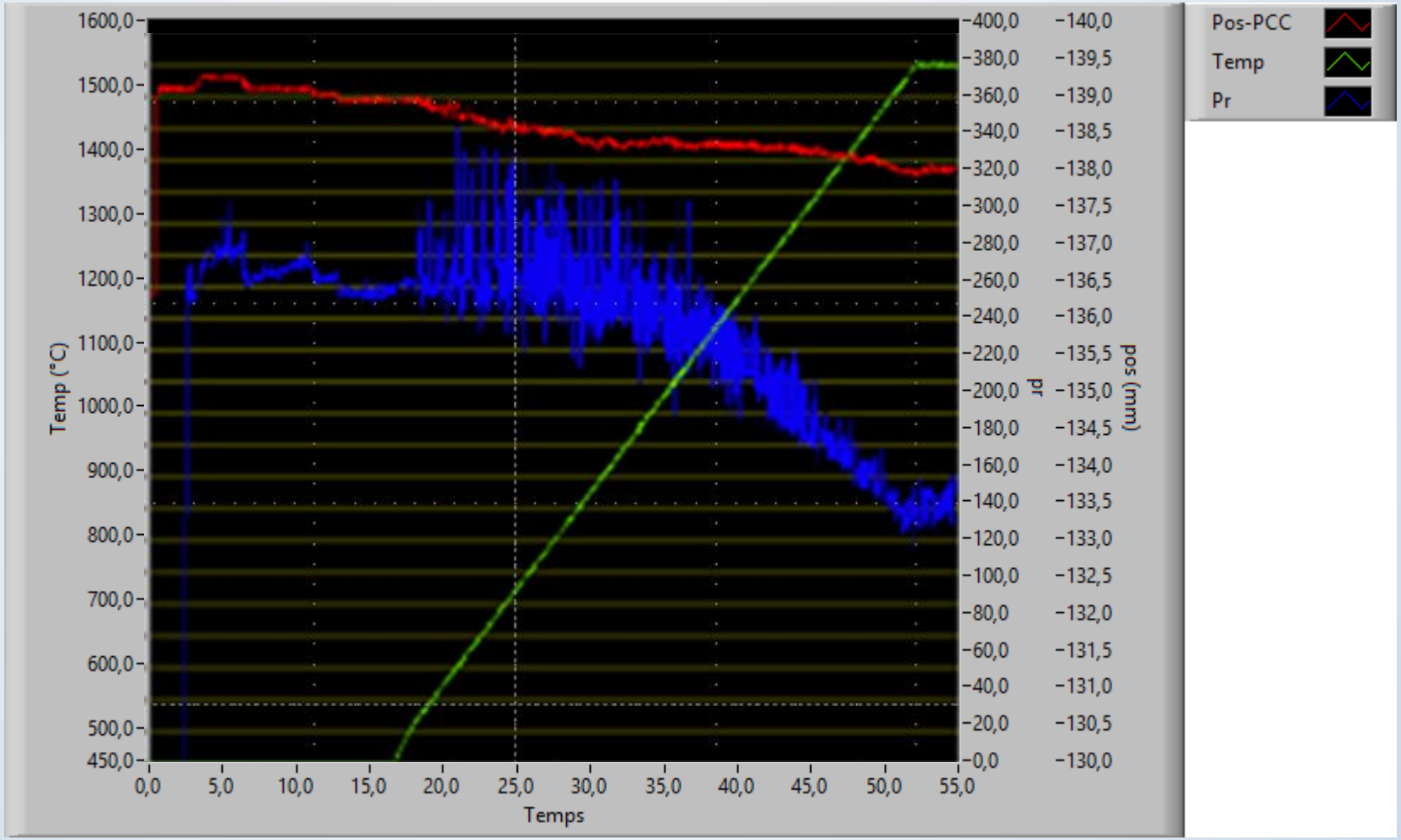
d) Piston Court Circuit motorisé

Acquisition de Données USB
(Measurement Computing)

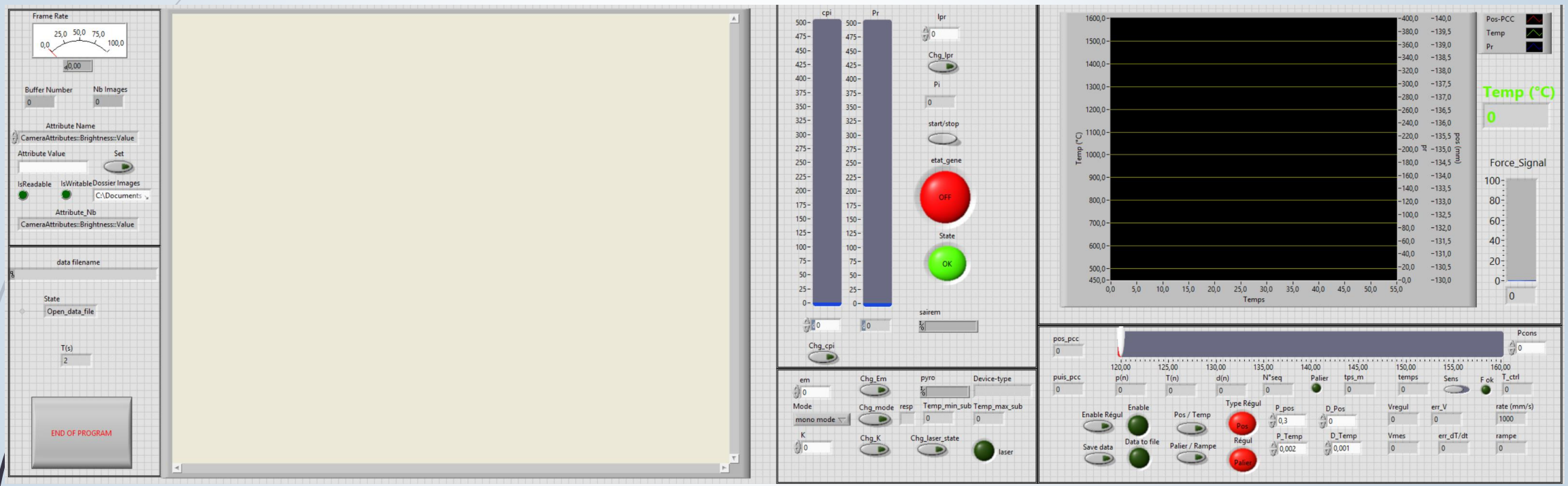
ULx for NI LabVIEW



e) Grandeurs physiques



f) IHM


Frame Rate
Buffer Number
Nb Images
Attribute Name
CameraAttributes::Brightness::Value
Attribute Value
Set
IsReadable
IsWritable
Dossier Images
Attribute_Nb
data filename
State
Open_data_file
T(s)
END OF PROGRAM
cpi
Pr
Ipr
Chg_Ipr
Pi
start/stop
etat_gene
OFF
State
OK
sairem
Chg_cpi
em
Chg_Em
pyro
Device-type
Mode
mono mode
Chg_mode
resp
Temp_min_sub
Temp_max_sub
K
Chg_K
Chg_laser_state
laser
Temp (°C)
Force_Signal
Pos-PCC
Temp
Pr
Temps
pos_pcc
Pcons
puis_pcc
p(n)
T(n)
d(n)
N°seq
Palier
tps_m
temps
Sens
F ok
T_ctrl
Enable Régul
Enable
Pos / Temp
Type Régul
P_pos
D_Pos
Vregul
err_V
rate (mm/s)
Save data
Data to file
Palier / Rampe
Régul
P_Temp
D_Temp
Vmes
err_dT/dt
rampe

3) Le code …

Structure événementielle
14 évènements

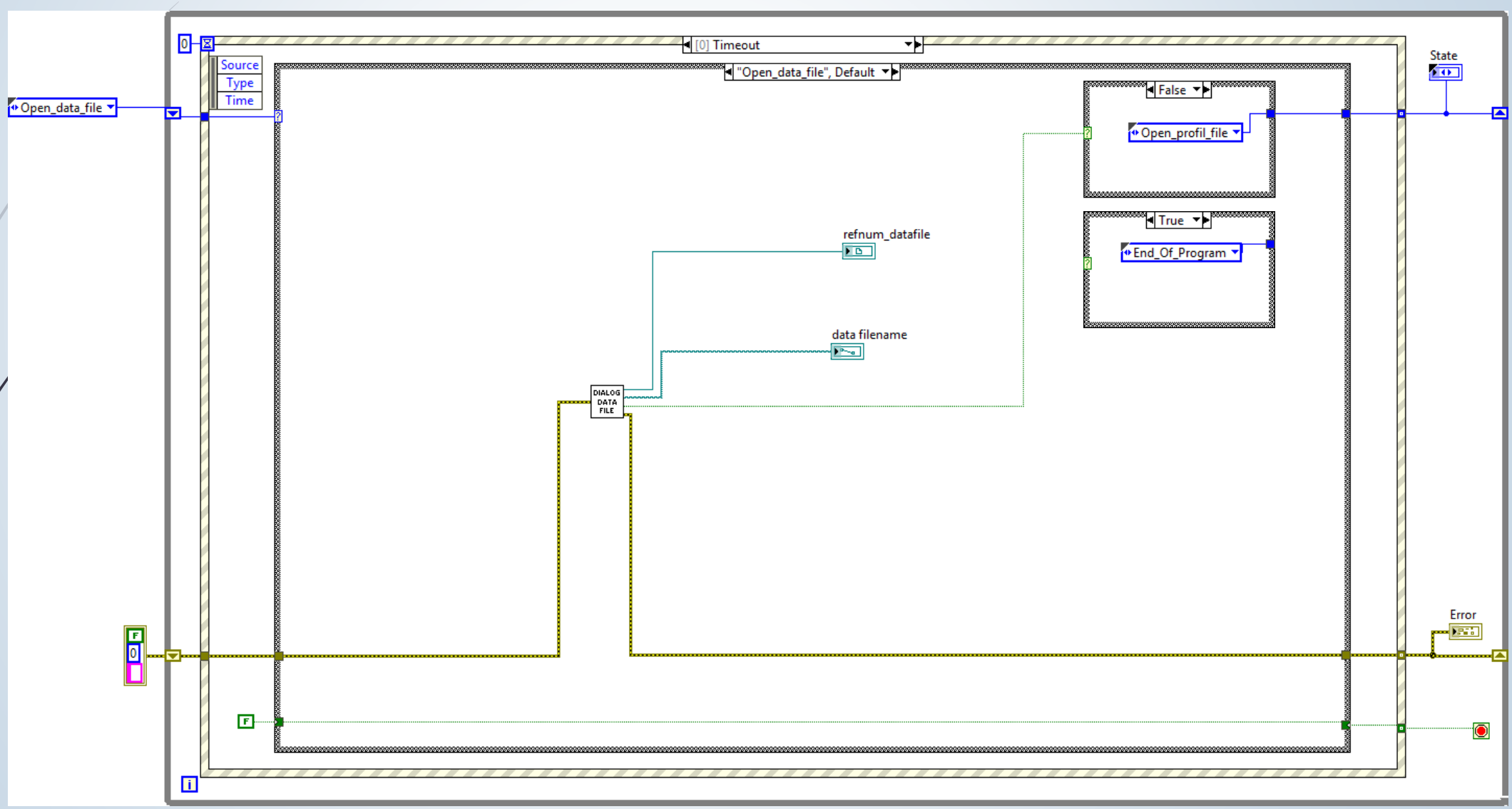
End Of Program
Start / Stop
Chgt Laser State
Chgt Mode Pyro
Chgt Emissivité
Chgt Rapport Emissivités
Chgt Puiss. Incidente
Chgt Limite Puiss. Réfléchie
Choix Régulation Pos / Temp
Validation Régulation
Palier / Rampe
Choix du paramètre Caméra
Valeur du paramètre
Sauvegarde données

On timeout

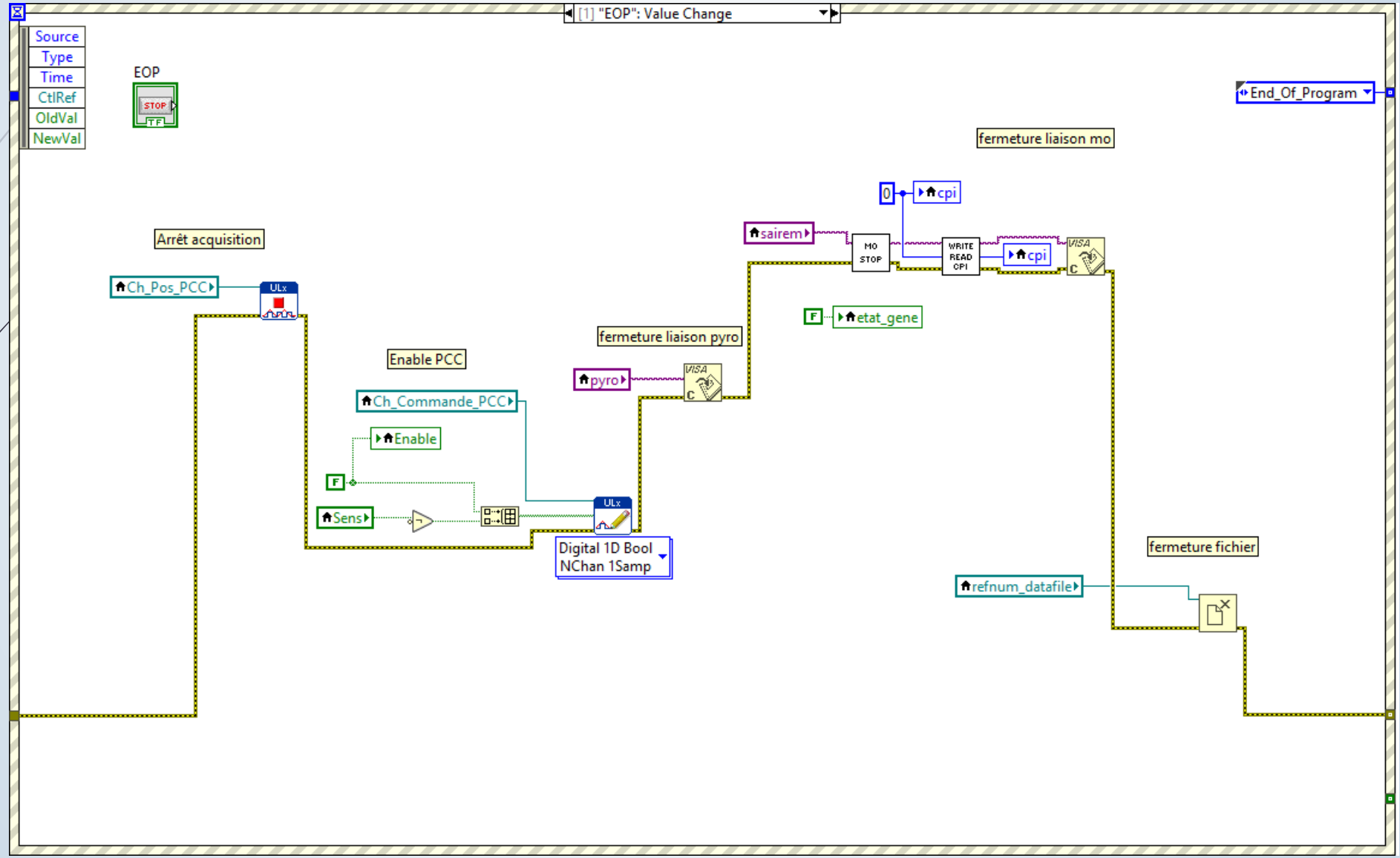
Machine à états
17 actions
(énumérations)

- ✓ Open_data_file
- Open_profil_file
- Init_Profil
- Init_AD_DA
- Open_COMx
- Open_Camera
- Init_var
- Measure
- Temp_regul
- Ramp_end
- Ramp_new
- Temp_SP
- Pos_regul
- PCC_depl
- Graph
- Save_Data
- End_Of_Program

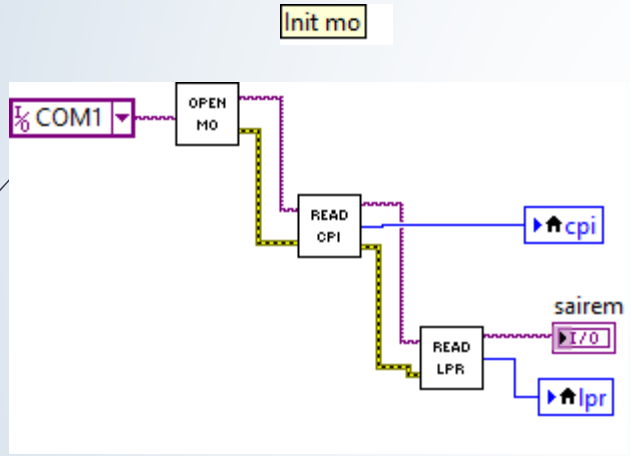
3) Le code ...

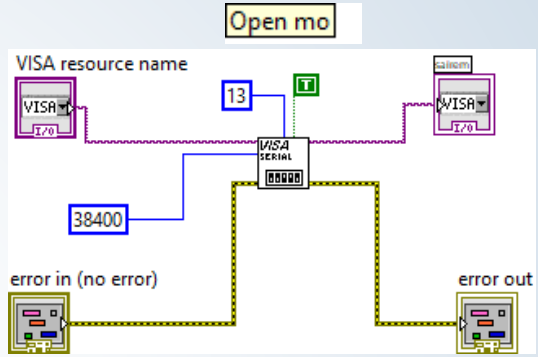

[0] Timeout
"Open_data_file", Default
Source
Type
Time
Open_data_file
State
False
Open_profil_file
True
End_Of_Program
refnum_datafile
data filename
DIALOG DATA FILE
Error

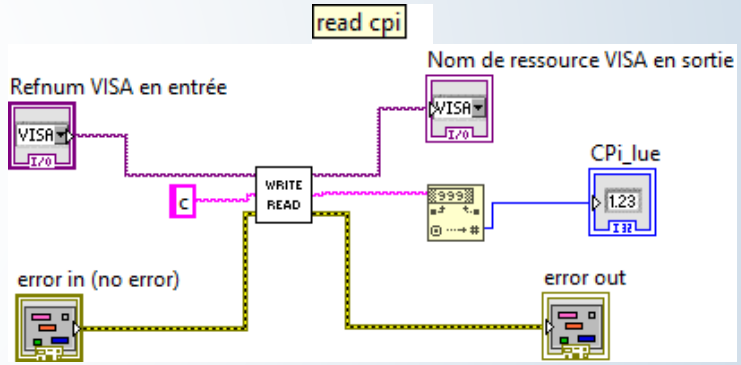
3) Le code ...

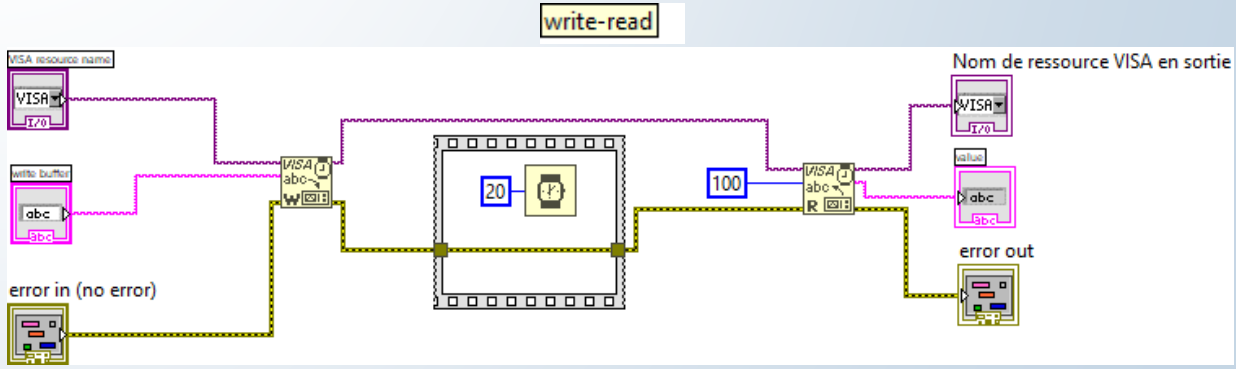

[1] "EOP": Value Change
Source
Type
Time
CtlRef
OldVal
NewVal
EOP
STOP
TF
End_Of_Program
fermeture liaison mo
0
cpi
sairem
MO STOP
WRITE READ CPI
cpi
VISA
C
Arrêt acquisition
Ch_Pos_PCC
ULx
etat_gene
fermeture liaison pyro
Enable PCC
pyro
VISA
C
Ch_Commande_PCC
Enable
F
Sens
ULx
Digital 1D Bool
NChan 1Samp
fermeture fichier
refnum_datafile

a) Générateur micro-ondes

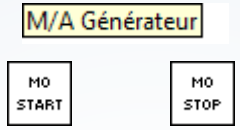


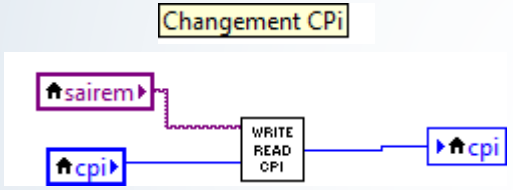


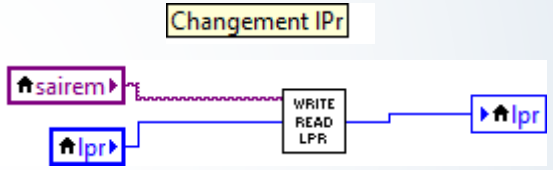


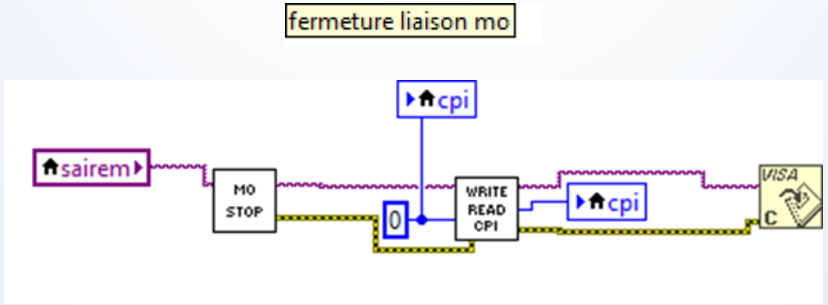


a) Générateur micro-ondes

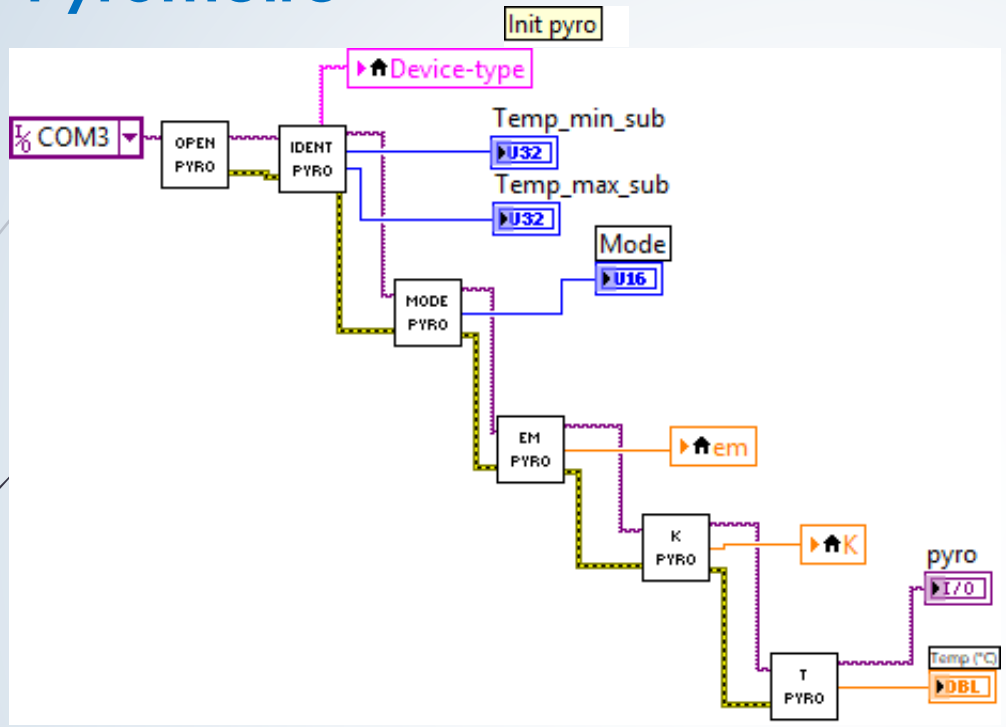


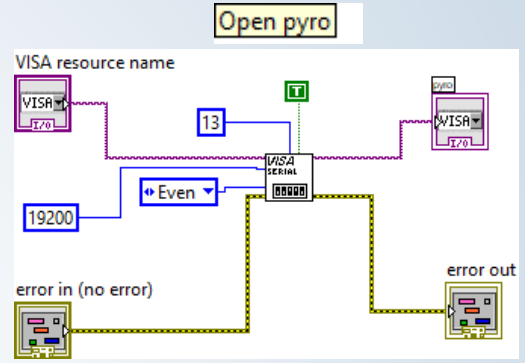


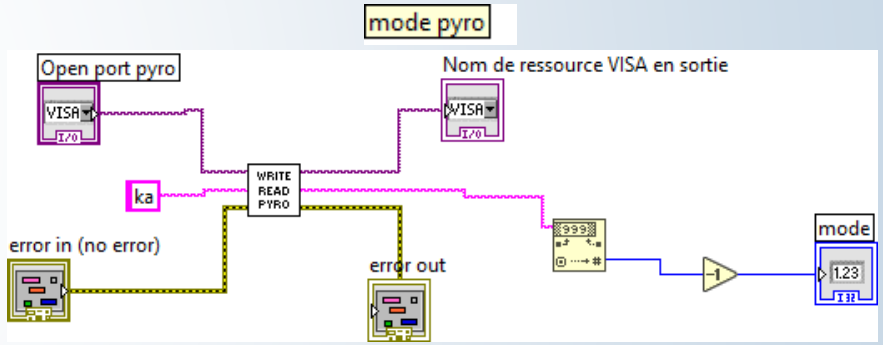


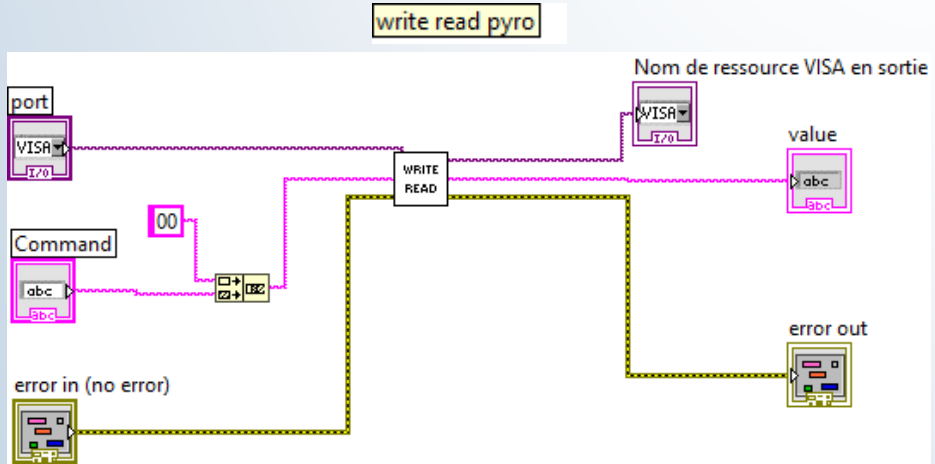


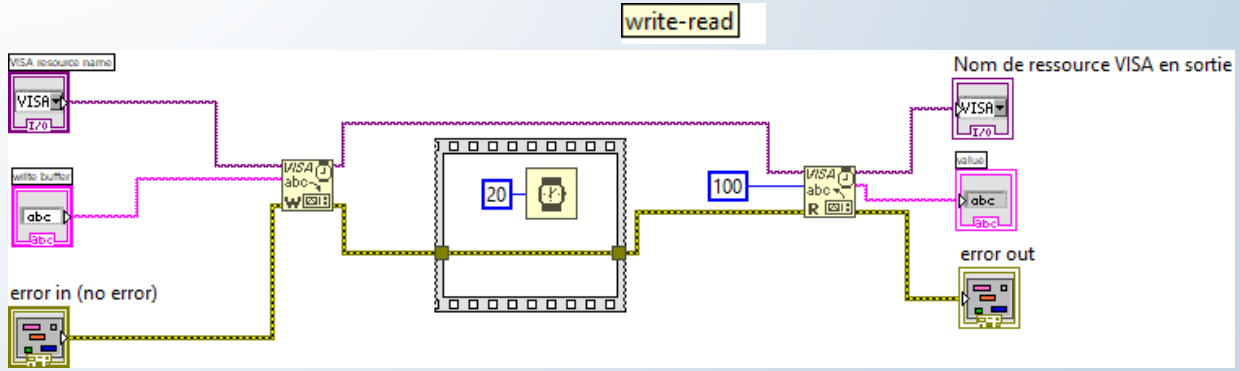
b) Pyromètre


Init pyro
Device-type
COM3
OPEN PYRO
IDENT PYRO
Temp_min_sub
U32
Temp_max_sub
U32
Mode
U16
MODE PYRO
EM PYRO
em
K PYRO
K
T PYRO
pyro
I/O
Temp (°C)
DBL


Open pyro
VISA resource name
13
Even
19200
error in (no error)
error out

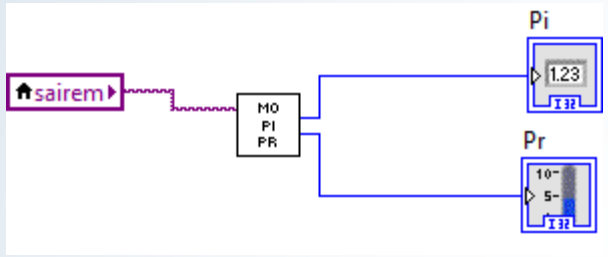

mode pyro
Open port pyro
Nom de ressource VISA en sortie
ka
WRITE READ PYRO
error in (no error)
error out
mode
1.23


write read pyro
Nom de ressource VISA en sortie
port
value
WRITE READ
00
Command
error out
error in (no error)

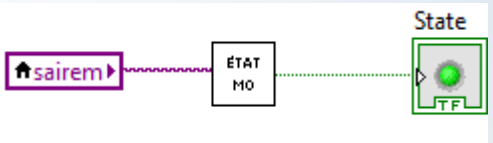

write-read
Nom de ressource VISA en sortie
20
100
error out
error in (no error)

b) Pyromètre

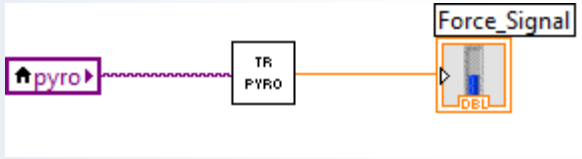
mesures puissances



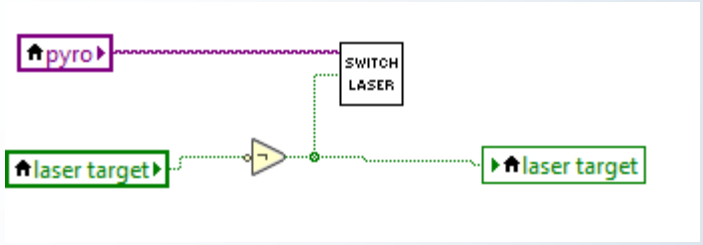
Défaut mo



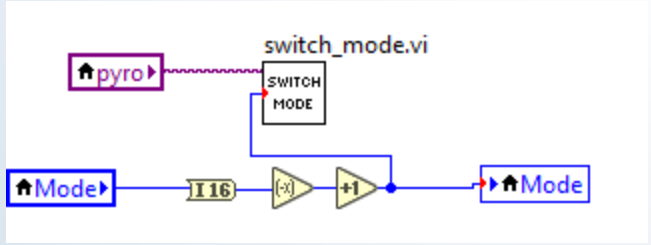
Qualité Signal Pyro



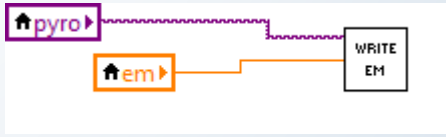
Allume / éteint laser pyro



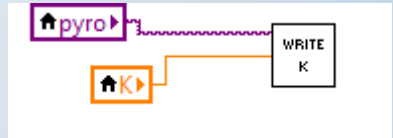
Changement mode pyro



Changement émissivité

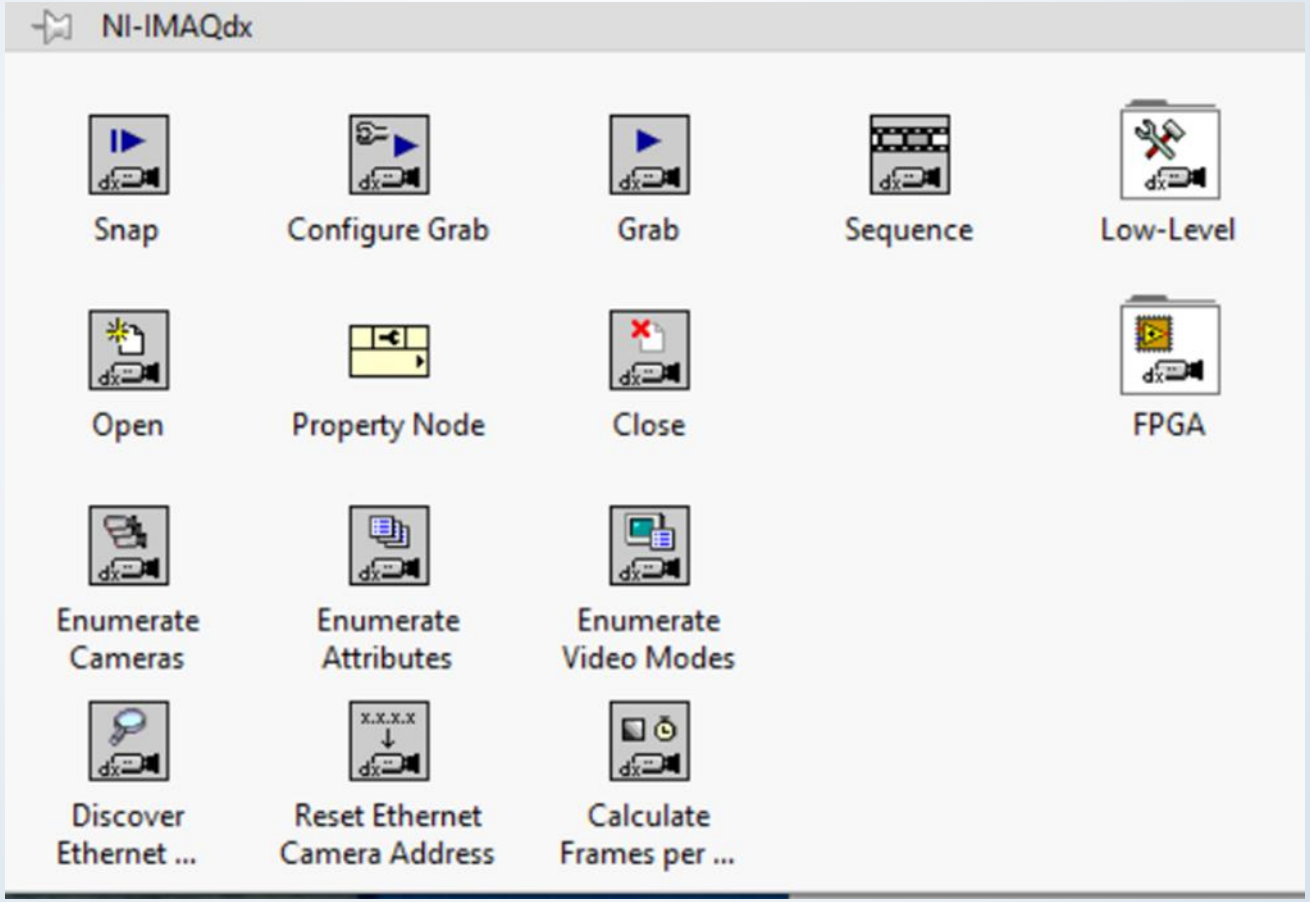


Changement K

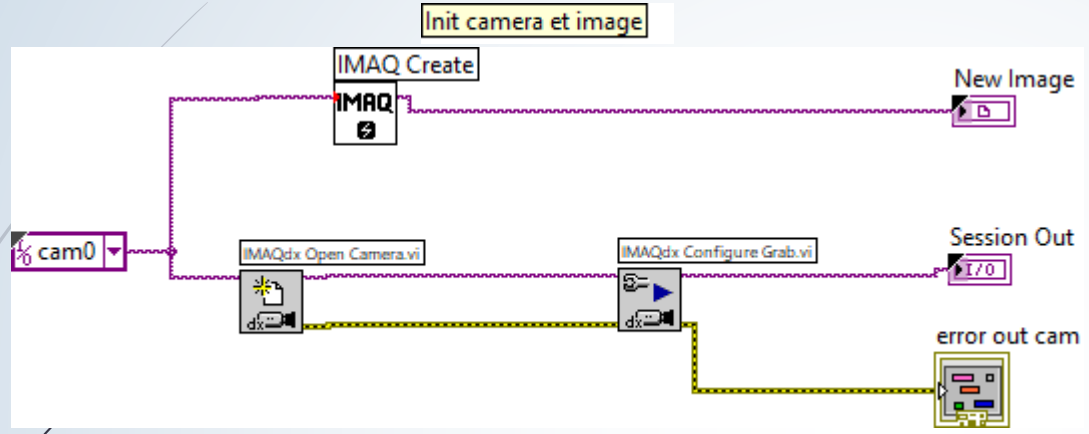


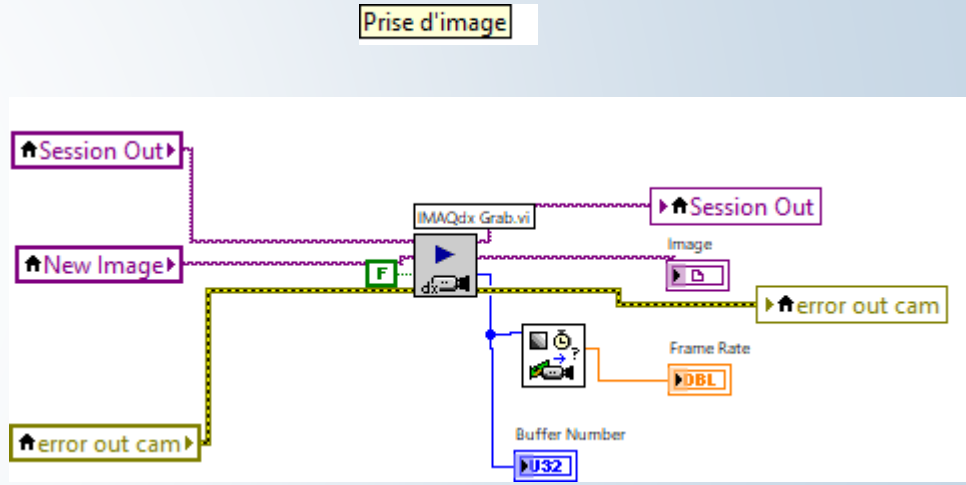
fermeture liaison pyro

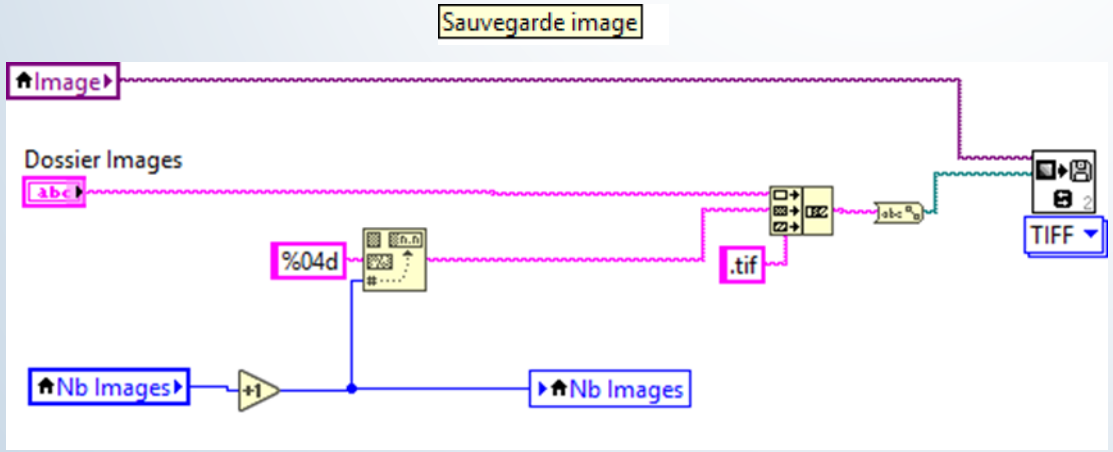
c) Caméra


NI-IMAQdx
Snap
Configure Grab
Grab
Sequence
Low-Level
Open
Property Node
Close
FPGA
Enumerate Cameras
Enumerate Attributes
Enumerate Video Modes
Discover Ethernet ...
Reset Ethernet Camera Address
Calculate Frames per ...

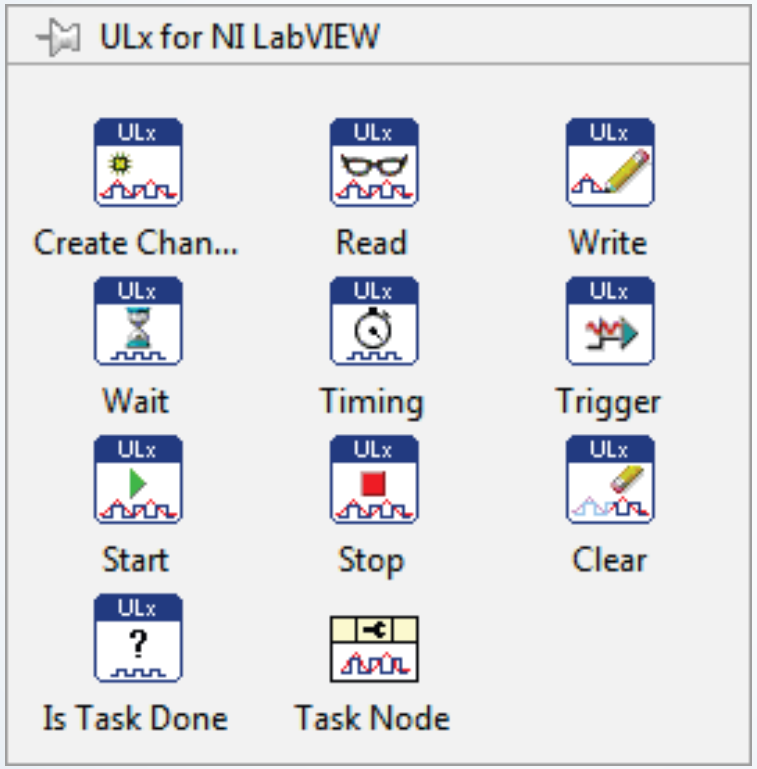
c) Caméra


Init camera et image
IMAQ Create
New Image
cam0
IMAQdx Open Camera.vi
IMAQdx Configure Grab.vi
Session Out
error out cam


Prise d'image
Session Out
New Image
error out cam
IMAQdx Grab.vi
Session Out
Image
error out cam
Frame Rate
Buffer Number

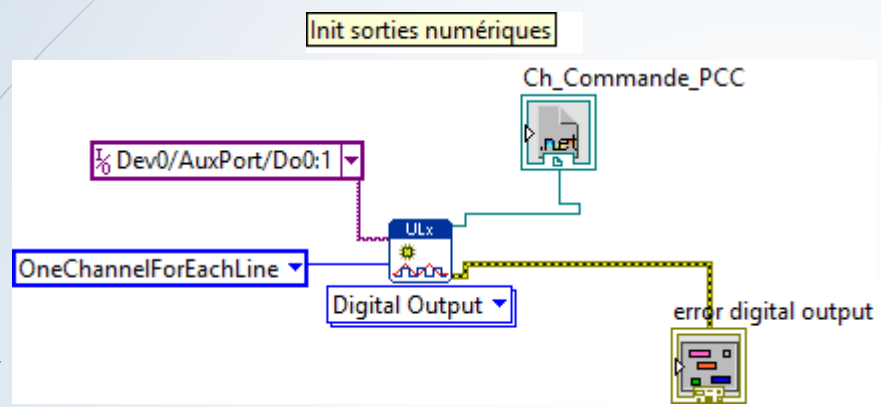

Sauvegarde image
Image
Dossier Images
%04d
.tif
TIFF
Nb Images
+1
Nb Images

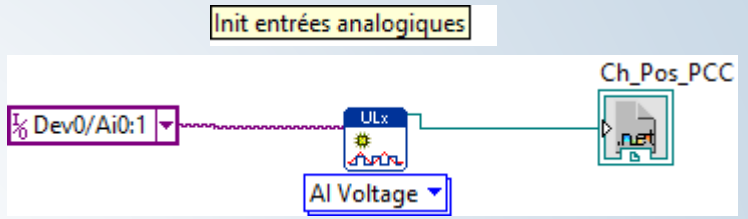
d) Piston fond de cavité

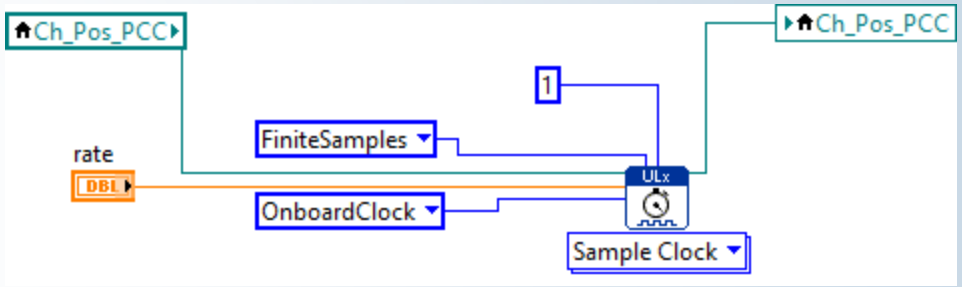


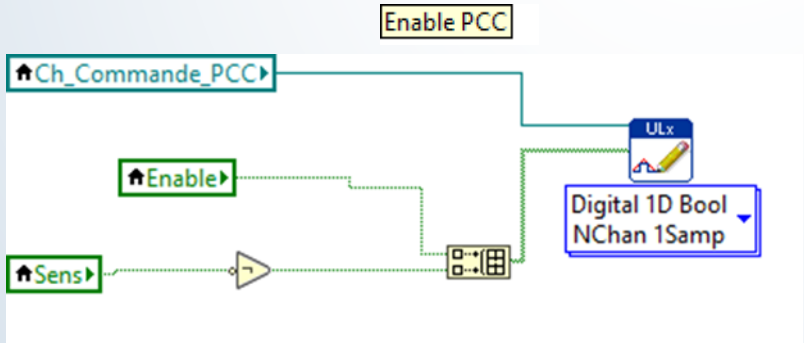
~ NI-DAQmx

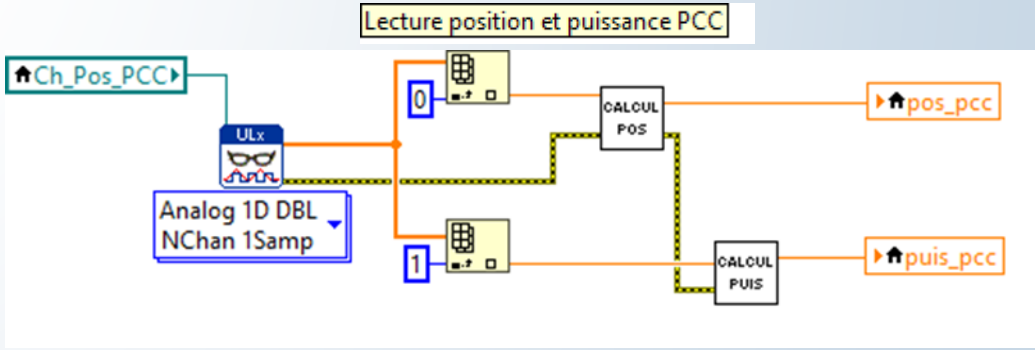
d) Piston fond de cavité

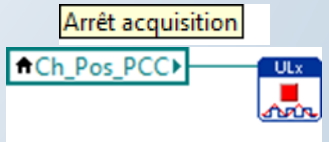




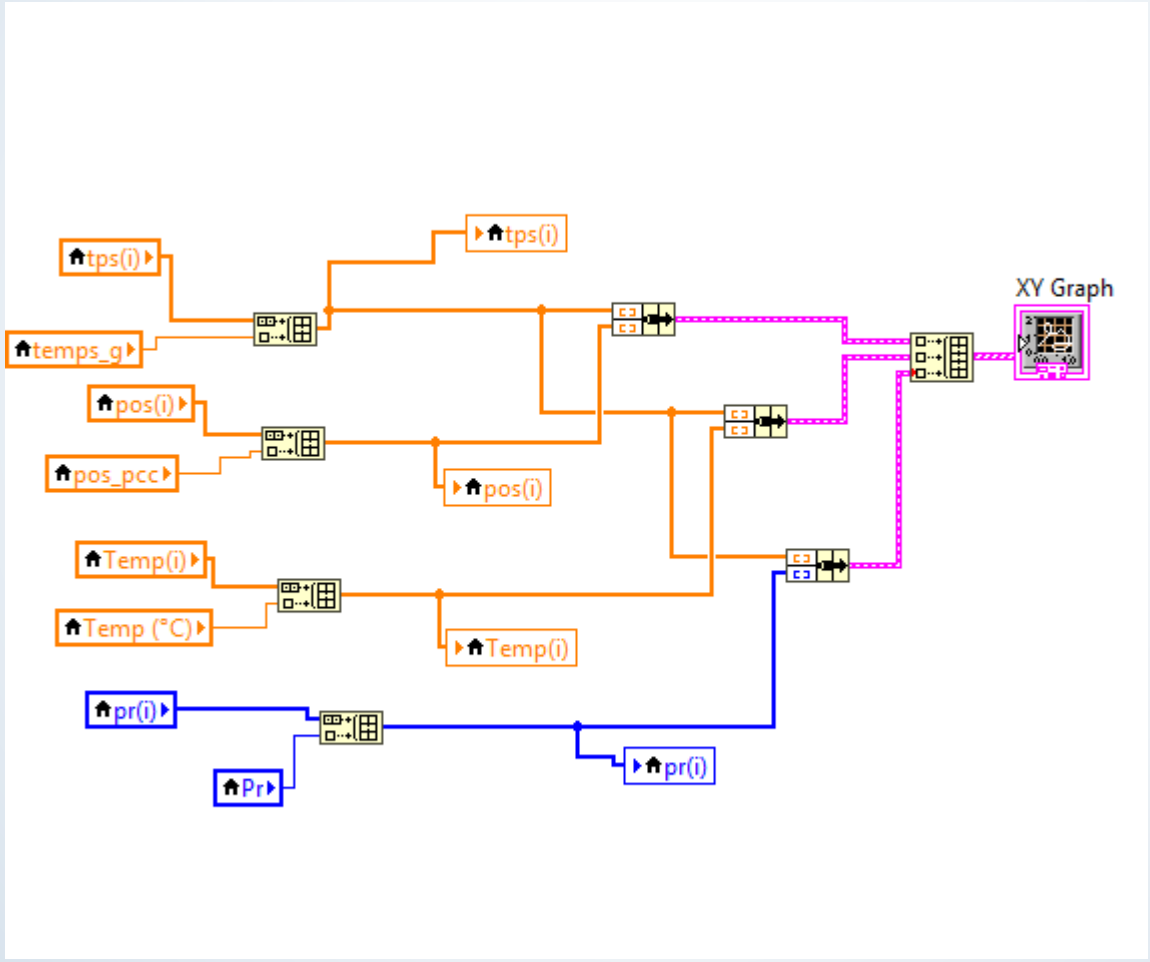








e) Visualisation graphique



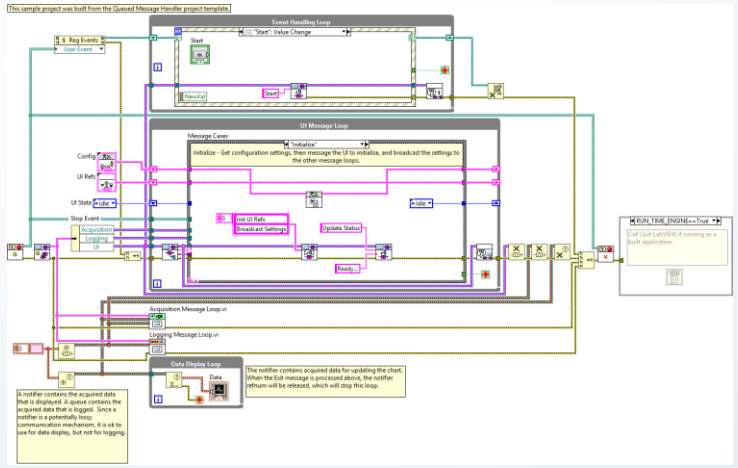
4) Et maintenant ?

Masquer certaines zones de l'IHM en fonction des choix

→ GUI Interlocks ☺

→ Onglets

Boucles parallèlles



5) Questions / réponses

A vos commentaires !